

# (12) UK Patent Application (19) GB (11) 2 389 274 (13) A

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**GB 2322036 A** EP 1150473 A1  
**WO 2000/049819 A1** US 5987100 A  
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(54) Abstract Title: **Delivering an SMS message addressed to a mobile telephone to an associated e-mail address**

(57) Method and apparatus for operating a telecommunications network (A), the method comprising determining that the SMS message has not been successfully delivered in SMS format to a destination address of a mobile telephone, determining whether there is a stored e-mail address which is associated with the destination address, if such an e-mail address is stored then the message is converted into a format suitable for sending as an e-mail, and the message is sent to that e-mail address.

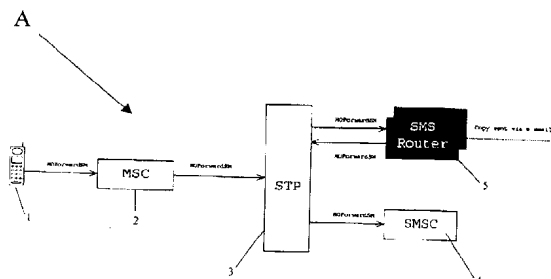


Figure 1

GB 2 389 274 A

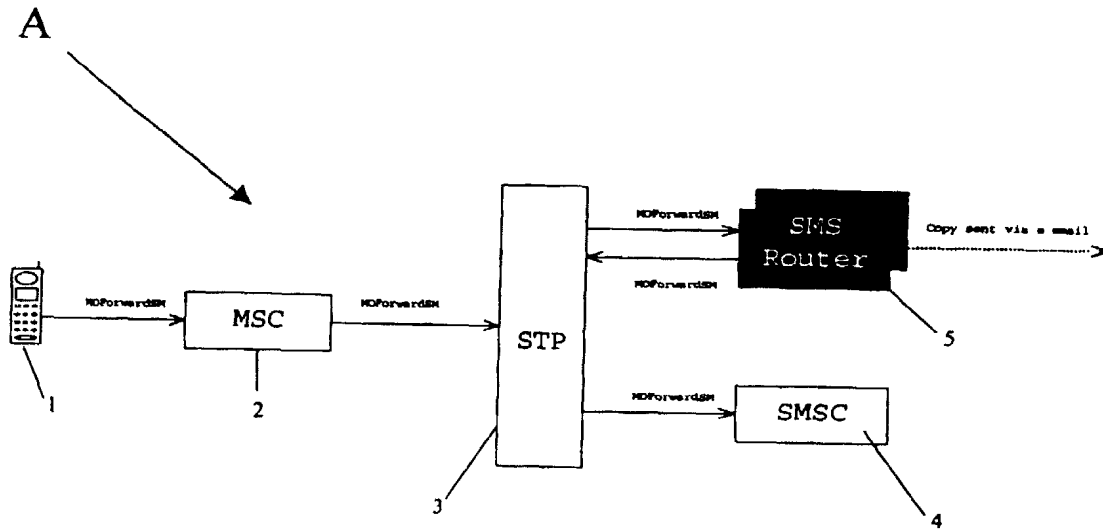


Figure 1

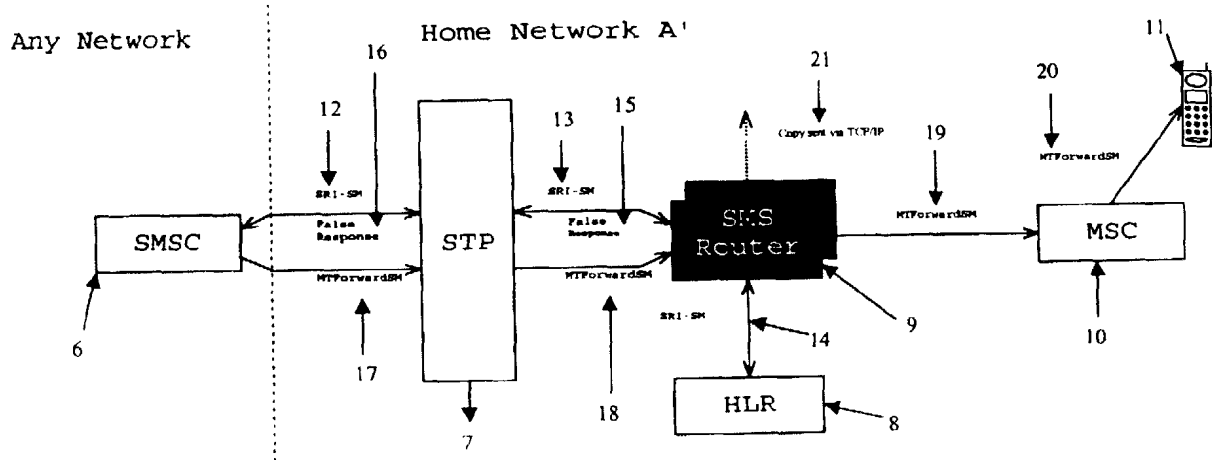


Figure 2

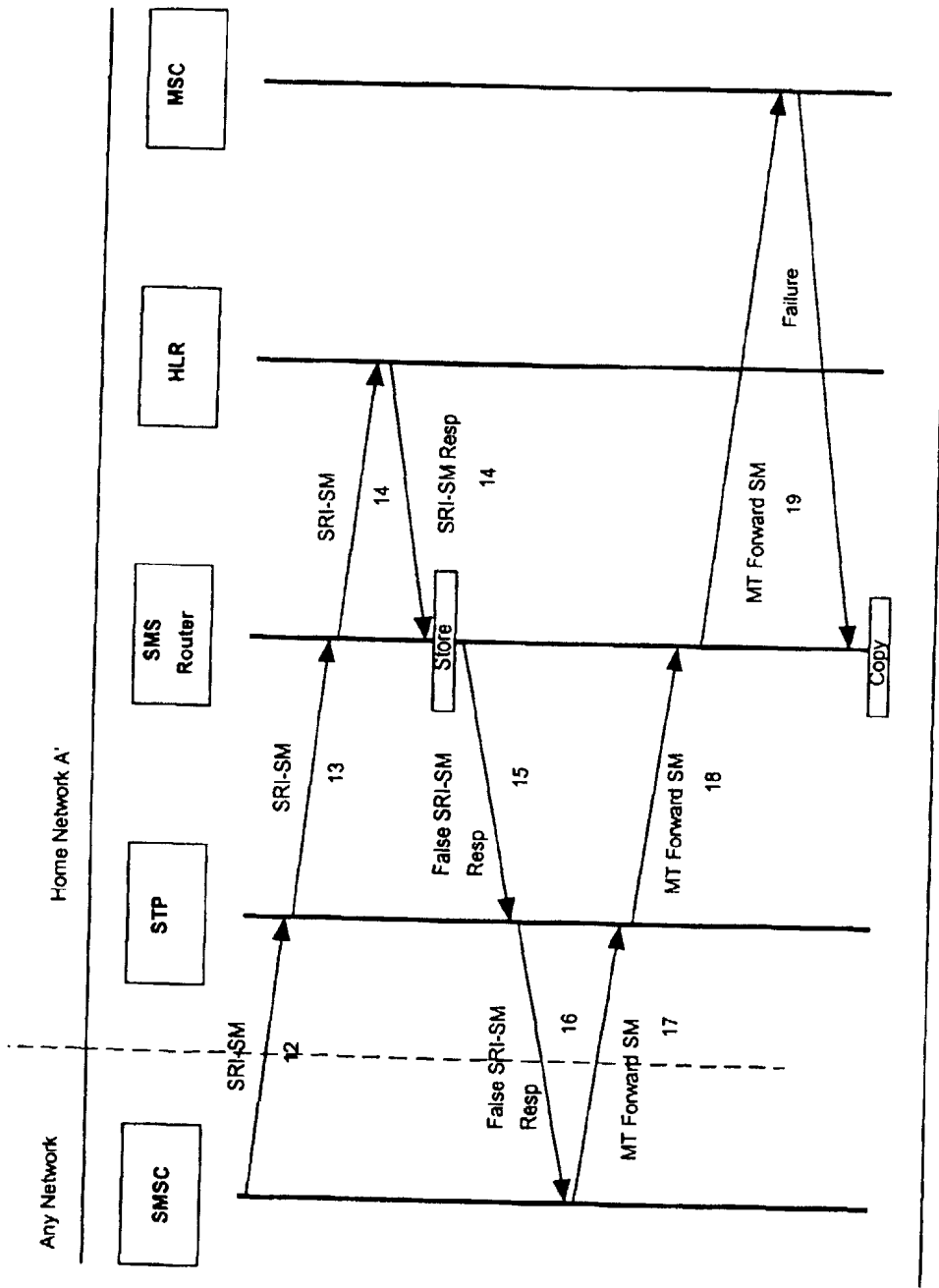


Figure 3

**TELECOMMUNICATIONS SERVICES APPARATUS.**

The present invention relates to telecommunication networks and in particular, but not exclusively, to text messaging services.

In GSM the Short Message Services (SMS) allow Mobile Stations (MS) to send and receive short text messages. The messages are normally routed via a Short Message Service Centre (SMSC), which provides a store and forward function. The SMSC will attempt to deliver each message to its destination, which may be another MS or a host address in the same or another network. Due to improvements in radio coverage, battery life and handset technology, Short Messages are now more likely than ever to be delivered rapidly to their intended destination.

However there are still occasions when an SMS may be undeliverable for a protracted period. The delivery delay may be caused by many reasons including-

- phone out of coverage
- phone off
- phone roaming in another network and barred from receiving SMS due to subscription.

Many users of SMS are unaware of the validity period feature of SMS, and that if a message is not delivered within the validity period set for that message, then the message is discarded without notice. The validity period is controlled by a setting in the handset, and may be set to a wide range of values from as low as an hour to a maximum which is network-

dependent. Most users do not change their setting from whatever default is set when the handset is delivered.

There are many parts of the world where GSM coverage is sparse or non-existent, even in developed countries that may have alternative systems  
5 such as CDMA. For the user who wishes to be universally reachable there is still no complete solution.

World-wide Internet accessibility is now taken for granted, and Internet Cafés can be found in even some remote parts of the world. Access to Internet and e-mail may be the only means of communication for the  
10 traveller if he is not in an area where his mobile telephone subscription is usable.

Mobile telephone voice communication and text messaging are the primary means of telecommunication for many people, but its use is limited to areas of mobile phone coverage.

15 Several mobile telephone standards are prevalent world-wide, and there exists incompatibility between the technologies so that a subscription and equipment that is operable in one territory may not necessarily work in another. Europe and America provide a good example where Europe's mobile telephony is mostly GSM whilst America has mainly CDMA.  
20 Alternative equipment may be hired locally, and in some cases the Subscriber Identity Module (SIM) card and subscription may be usable with alternative technology handsets.

According to a first aspect of the invention, there is provided a method of operating a telecommunications network comprising sending a message  
25 to an e-mail address after at least one unsuccessful attempt to send the

message to an address of a mobile station, the address of the mobile station being associated with the e-mail address.

A 'message' (as distinct from a voice call) may comprise one or a combination of text representative of alphanumeric characters, graphics  
5 material, audio material, or video material. For example a message may be an SMS message, or may be an EMS (Enhanced Message Service) message.

Preferably the method comprises comparing a destination address of the message with stored destination addresses, and determining whether there  
10 is a stored e-mail address which is associated with the destination address of the message.

The method preferably comprises converting the message into a format suitable for sending as an e-mail.

The method may comprise determining that a signal is a routing query  
15 signal, which signal is representative of a request for routing information for the message which is to be sent.

Preferably the routing query signal is diverted to router apparatus. Most preferably an address of the router apparatus is transmitted in response to routing query signal.

20 The method desirably comprises causing the message to be sent to router apparatus.

Most preferably the method comprises causing router apparatus to send the message to an associated e-mail address if at least one unsuccessful delivery attempt is made.

According to a second aspect of the invention there is provided telecommunications apparatus which is configured to cause at least one attempt to be made to deliver a message to a mobile station, and if the at least one attempt is unsuccessful then the telecommunications apparatus  
5 being configured to cause the message to be sent to an e-mail address which is associated with the address of the mobile station.

Preferably the apparatus comprises a database of addresses of mobile stations and associated e-mail addresses, the apparatus being configured to receive and forward a message to be sent to a mobile station, the  
10 apparatus being further configured to determine if an address of a mobile station to which a message is being sent has an associated e-mail address.

Preferably the apparatus is configured to cause at least one further attempt to deliver the message to the mobile station in addition to sending the message to the associated e-mail address. So, for example, after a  
15 predetermined number of attempts to deliver the message via a mobile telecommunications network, the message may be sent to an associated e-mail address, and further attempts may also be made to send the message via the mobile telecommunications network.

The apparatus is most preferably configured to convert the message into  
20 a format suitable for sending as an e-mail.

The apparatus preferably comprises router apparatus.

According to a third aspect of the invention there is provided telecommunications apparatus which is configured to determine whether a received signal is a routing query signal, the routing query signal being  
25 representative of a request for routing information for the message which



is to be sent, and the apparatus being further configured to send the routing query signal to router apparatus.

The telecommunications apparatus may comprise a signal transferring apparatus.

- 5 According to a fourth aspect of the invention there is provided a machine readable data carrier, which when loaded onto a computer implements the method of the first aspect of the invention.

According to a fifth aspect of the invention there is provided a machine readable data carrier, which when loaded onto a computer causes  
10 telecommunications apparatus to function in accordance with the apparatus of the second aspect of the invention.

According to a sixth aspect of the invention there is provided a machine readable data carrier, which when loaded onto a computer causes telecommunications apparatus to function in accordance with the  
15 apparatus of the third aspect of the invention.

It will be appreciated that a 'machine readable data carrier' may comprise an optical or magnetic data storage device, for example a compact disc, a DVD or a diskette.

In a preferred embodiment of the invention there is provided a  
20 telecommunications services apparatus for use with a mobile telephone network comprising means for receiving and transmitting short messages within a mobile telephone network, means for storing e-mail addresses associated with the mobile telephone numbers of subscribers, means for receiving information representing the e-mail address of a subscriber and  
25 storing the information in the storage means, means for copying an

undelivered short message to storage means and converting said message to a format suitable for transmission by e-mail, the apparatus being arranged such that, in use, a converted copy of the message is delivered to the e-mail address associated with a destination mobile telephone number of the short message in the event of one or more unsuccessful attempts to deliver the original short message via the mobile telephone network.

Several embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

10       **Figure 1** shows a block diagram of part of a telecommunications network in which the invention has been implemented;

**Figure 2** shows a block diagram of parts of two telecommunications networks in which the invention has been implemented; and

15       **Figure 3** is a ladder diagram of the various steps which are performed in the embodiment shown in Figure 2.

An embodiment of the invention is shown in Figure 1. A text message is sent from MS 1, and via a Mobile Switching Centre (MSC 2), is directed by the Signalling Transfer Points (STP's) of mobile telephone network A to pass through an SMS Router 5 prior to arriving at an SMSC 4. The SMS Router 5 compares the destination mobile telephone number of the text message with a list of such numbers in a database, for which associated e-mail addresses are provided. If a match is found, this indicates that the destination number belongs to a subscriber of network A who has registered an e-mail address as an alternative destination for undeliverable SMS message. In this case the SMS Router 5 may attempt to deliver the text message directly to the subscriber instead of

forwarding it immediately to the SMSC 4. After a configurable number of attempts to deliver the message in this way, the SMS Router 5 will not only pass the message to the SMSC 4 so that repeated attempts to deliver the message by normal means can continue, but will also convert the message to e-mail format and deliver it via the e-mail network to the registered e-mail address. In normal use, the subscriber may receive the message on his mobile telephone, either delivered directly by the SMS Router 5, or delivered by store and forward from the SMSC 4. However, when the user is out of mobile telephone coverage he now also has the option of checking his e-mail account for messages, in the knowledge the every message will be delivered to him by one or other method, and that no messages will ever be missed due to expiry or non-delivery.

It will be appreciated however that this embodiment provides the stated functionality only for messages sent by subscribers of network A', i.e. the same network as the recipient. This is because in the described embodiment, only mobile originated (MO) messages from network A are able to be directed to the SMS Router within network A.

With reference to Figures 2 and 3, a preferred embodiment is now described which permits mobile terminated (MT) messages from any network to be afforded the same treatment and the same benefits for a recipient who subscribes to network A'.

A known technique called SRI-aliasing is used in conjunction with the invention to provide access to messages sent from any network to subscribers of network A'.

For mobile terminated messages there is no guarantee that in normal circumstances messages delivered to a subscriber's handset will pass through the subscriber's home network at all. The message first passes

to an SMSC in the sending subscriber's home network, and then passes directly to the visited MSC of the recipient who may be roaming in any network. Interception of the message for the purpose of copying to e-mail is therefore difficult.

- 5 It is known however that in order to deliver a message to a subscriber, a query must be made to a Home Location Register 8 (HLR) of the network A' in order to determine the current location of the destination subscriber. In the case of short messages this query is known as "send routing information for short message" or SRI\_SM. It is also known that
- 10 STPs can be programmed to divert signalling messages to an alternative destination. In some cases it is possible to divert SRI\_SM messages (and the SRI equivalent messages to voice calls) without diverting other types of messages. The present invention makes use of this diversion by sending SRI\_SM messages directed to the HLR 8 in network A' via an
- 15 SMS Router 9 in network A' (as shown at 12 and 13). The SMS Router 9 is then able to reply to this query on behalf of the HLR 8 (as shown at 15 and 16). However instead of returning the location of the subscriber the SMS Router 9 can return its own location (ie a so-called 'False Response'). The effect of this is that the short message will be
- 20 delivered not to a MS 11 of a subscriber but initially to the SMS Router 9. The message is then sent from the SMSC 6, via the STP 7, to the SMS Router 9 (as indicated at 17 and 18). This is true regardless of the current locations of either the sender or the recipient. The SMS Router 9 is then able to implement any desired processing on the text
- 25 message, for example copying to e-mail, before finally forwarding the message onto the actual location of the subscriber as indicated by the HLR 8, which is stored in the SMS Router 9 as a result of the challenge and response at 14. The message is then sent to the MSC 10 and then to the MS 11 (as shown at 19 and 20).

With reference to Figure 3, the HLR query at 14 is shown being made immediately the SRI\_SM message arrives at the SMS Router. In practice, since the HLR response is not used until step 19, the HLR query may be delayed until after step 16, or delayed until after step 17. The reply may be sent before or after the HLR 8 is queried, and before or after the HLR response is received.

The combined effect of using the presently known technique for mobile originated SMS messages and using the present invention for mobile terminated SMS is that all messages to and from a subscriber may be caused to pass through an SMS Router before reaching their destination. The SMS Router is capable of acting on the contents or addresses within the message to provide the desired functions of attempted direct delivery followed by message copy to e-mail if the direct delivery is unsuccessful. The failure to deliver in this case is passed back to the SMSC in the sending network, which will retry according to its standard retry algorithm. The SMS Router may keep a record of the message reference number (a field of the SMS addressing) and the SMSC identity to avoid repeatedly copying the same message as the SMSC retries.

The present invention is distinct from SMS Copy, since an SMS Copy service is understood to be one which takes an archive copy of every short message that is destined for given subscriber. Such copies may be archived to e-mail or to another store. In the present invention messages are only forwarded to e-mail if an initial delivery attempt or attempts fail by normal means.

The present invention is also distinct from SMS divert. Divert is a facility allowed for in the GSM specifications but not implemented by most operators, whereby short messages can be redirected to an alternative mobile telephone number under user control.

The present invention thus advantageously provides a means for users to retrieve an undelivered short message from an Internet terminal anywhere.

5 The present invention also provides an alternative method for delivery of text messages that might otherwise remain undelivered or exceed their period of validity. By transferring the message from the mobile telephone network to the e-mail network, access becomes universal.

**CLAIMS**

1. A method of operating a telecommunications network comprising sending a message to an e-mail address after at least one unsuccessful attempt to send the message to an address of a mobile station, the address  
5 of the mobile station being associated with the e-mail address.
2. A method as claimed in claim 1, in which the method comprises comparing a destination address of the message with stored destination addresses, and determining whether there is a stored e-mail address which is associated with the destination address of the message.
- 10 3. A method as claimed in claim 1 or claim 2, in which the method comprises converting the message into a format suitable for sending as an e-mail.
4. A method as claimed in any preceding claim, in which the method comprises determining that a signal is a routing query signal, said signal  
15 being representative of a request for routing information for the message which is to be sent.
5. A method as claimed in claim 4, in which the routing query signal is diverted to router apparatus.
6. A method as claimed in claim 5, in which an address of the router  
20 apparatus is transmitted in response to routing query signal.
7. A method as claimed in any preceding claim which comprises causing the message to be sent to router apparatus.

8. A method as claimed in claim 7 which comprises causing the router apparatus to send the message to an associated e-mail address if at least one unsuccessful delivery attempt is made.
- 5 9. Telecommunications apparatus which is configured to cause at least one attempt to be made to deliver a message to a mobile station, and if the at least one attempt is unsuccessful then the telecommunications apparatus being configured to cause the message to be sent to an e-mail address which is associated with the address of the mobile station.
- 10 10. Telecommunications apparatus as claimed in claim 9 which comprises a database of addresses of mobile stations and associated e-mail addresses, the apparatus being configured to receive and forward a message to be sent to a mobile station, the apparatus being further configured to determine if an address of a mobile station to which a message is being sent has an associated e-mail address.
- 15 11. Telecommunications apparatus as claimed in claim 9 or claim 10 which is configured to cause at least one further attempt to deliver the message to the mobile station in addition to sending the message to the associated e-mail address.
- 20 12. Telecommunications apparatus as claimed in any one of claims 9, 10 or 11 which is configured to convert the message into a format suitable for sending as an e-mail.
13. Telecommunications apparatus as claimed in any one of claims 9 to 12 which comprises router apparatus.



14. Telecommunications apparatus which is configured to determine whether a received signal is a routing query signal, the routing query signal being representative of a request for routing information for the message which is to be sent, and the apparatus being further configured to send the routing query signal to router apparatus.
15. Telecommunications apparatus as claimed in claim 14 which comprises a signal transferring apparatus.
16. A machine readable data carrier, which when loaded onto a computer implements the method as claimed in claim 1.
17. A machine readable data carrier, which when loaded onto a computer causes telecommunications apparatus to function in accordance with the apparatus as claimed in claim 9.
18. A machine readable data carrier, which when loaded onto a computer causes telecommunications apparatus to function in accordance with the apparatus as claimed in claim 14.
19. A method of operating a telecommunications network substantially as described and as shown in the accompanying drawings.
20. Telecommunications apparatus substantially as described and as shown in the accompanying drawings.
21. A telecommunications network substantially as described and as shown in the accompanying drawings.



INVEST IN PEOPLE

**Application No:** GB 0212502.9  
**Claims searched:** 1-21

**Examiner:** Emma Rendle  
**Date of search:** 17 October 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): H4L (LRAX, LDPC, LDPD)

Int Cl (Ed.7): H04Q 7/22; H04M 3/533

Other: Online: WPI, EPODOC, PAJ

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 1 150 473 A1 (MICROSOFT) see whole document, especially paragraphs 13, 23 and 28.	1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18
A	GB 2 322 036 A (ERICSSON) see whole document.	-
A	WO 00/49819 A1 (CELPAGE) see whole document.	-
A	US 5 987 100 (NORTHERN TELECOM) see whole document.	-
A	US 5 974 449 (CARMEL) see whole document.	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application